

REMARKS

Claims 1-10 are pending in the present application. Claims 1-10 have been rejected. Claims 1-10 have been cancelled. New Claims 11-26 have been added. No new matter has been introduced by these new claims. Reconsideration and allowance is respectfully requested in view of the following remarks.

The 35 U.S.C. § 112, first paragraph rejection

Claims 1-10 have been rejected under 35 U.S.C. § 112, first paragraph.

The Applicant has cancelled Claims 1-10, and therefore, the rejection is moot.

Reconsideration and withdrawal of this rejection is respectfully requested.

The 35 U.S.C. § 102(e) rejection

Claims 1, 3, 5, and 10 have been rejected under 35 U.S.C. § 102(e), as being anticipated by Shao (U.S. Patent No. 6,124,194). Applicant respectfully disagrees with the Examiner and traverses the rejection. Applicant has cancelled Claims 1, 3, 5, and 10, and therefore, the rejection as it applies to these claims is moot.

To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Barient, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 1007 (1988). Moreover, the single source must disclose all of the claimed elements “arranged as in the claim.” *Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1271 (Fed. Cir. 1984).

The Shao et al. reference teaches a method for fabricating an antifuse. Barrier layer 24 lines trench 22 and a first metal 26 is formed in trench 22, filling trench 22 over barrier layer 24. First metal via 26 defines the bottom contact and may comprise tungsten, aluminum, or copper. (Col. 2, lines 59-66) The Shao et al. reference does not teach as recited in Claims 11-26.

The Shao et al. reference does not teach “a first barrier metal layer forming a lower antifuse electrode disposed in a via in said cap layer over said lower Cu metal layer, said

via being narrower than said lower Cu metal layer, said first barrier metal layer having an upper surface planarized with an upper surface of said cap layer” as claimed. The Shao et al. reference teaches disposing a fusing element layer 34 having a layer of tantalum nitride 36 over the first metal via 26. (Col. 3, lines 14-20) The Shao et al. reference does not teach “said via being narrower than said lower Cu metal layer” as claimed.

Further, the Shao et al. reference does not teach “...said first barrier metal layer having an upper surface planarized with an upper surface of said cap layer; a layer of antifuse material disposed over said first barrier metal layer and having edges extending over said cap layer; a second barrier metal layer disposed over said antifuse material layer and having edges aligned with said edges of said antifuse material layer” as claimed. The Shao et al. reference teaches disposing the fusing element layer 34 over the structure, covering patterned SiN layer 28 and filling openings 30, 32. (Col. 3, lines 14-20) The Shao et al. reference does not teach the “first barrier metal layer having an upper surface planarized with an upper surface of said cap layer”, “antifuse material...having edges extending over said cap layer” and the “second barrier metal layer...having edges aligned with said edges of said antifuse material layer” as claimed. Because of these significant differences, the Shao et al. reference teaches a structure having a larger fusing element layer 34 that completely covers and extends past the SiN layer 28 on either end thus forming an unnecessarily large capacitor plate. Because the edges of fusing element layer 34 of Shao et al. extend up and over the cap layer, a step is created that renders the Shao et al. antifuse unmanufactureable as a practical matter.

The Shao et al. reference does not teach each and every element, nor the arrangement of these elements, as recited in the claims. Therefore, the Shao et al. reference does not anticipate the claimed invention.

Additionally, if an independent claim is not anticipated, then any claim depending therefrom is not anticipated. Claims 11 and 19 are not anticipated by the prior art, therefore, dependent Claims 12-18 and 20-26 are also not anticipated by the prior art.

Reconsideration and withdrawal of these rejections is respectfully requested.

The 35 U.S.C. § 103(a) rejection

Claims 2, and 6-9 have been rejected under 35 U.S.C. § 103(a), as being unpatentable over Shao et al. (U.S. Patent No. 6,124,194) in view of Yeouchung et al. (U.S. Patent No. 6,001,693). Applicant respectfully disagrees with the Examiner and traverses the rejections. Applicant has cancelled Claims 1, 3, 5, and 10, and therefore, the rejection as it applies to these claims is moot.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

To establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught by the prior art. *In re Royka*, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 165 USPQ 494 (CCPA 1970).

As stated above, the Shao et al. reference teaches a method for fabricating an antifuse. Barrier layer 24 lines trench 22 and a first metal 26 is formed in trench 22, filling trench 22 over barrier layer 24. First metal via 26 defines the bottom contact and may comprise tungsten, aluminum, or copper. (Col. 2, lines 59-66) The Shao et al. reference does not teach as recited in Claims 11-26.

The Shao et al. reference does not teach “a first barrier metal layer forming a lower antifuse electrode disposed in a via in said cap layer over said lower Cu metal layer, said via being narrower than said lower Cu metal layer, said first barrier metal layer having an upper surface planarized with an upper surface of said cap layer” as claimed. The Shao et

al. reference teaches disposing a fusing element layer 34 having a layer of tantalum nitride 36 over the first metal via 26. (Col. 3, lines 14-20) The Shao et al. reference does not teach “said via being narrower than said lower Cu metal layer” as claimed.

Further, the Shao et al. reference does not teach “...said first barrier metal layer having an upper surface planarized with an upper surface of said cap layer; a layer of antifuse material disposed over said first barrier metal layer and having edges extending over said cap layer; a second barrier metal layer disposed over said antifuse material layer and having edges aligned with said edges of said antifuse material layer” as claimed. The Shao et al. reference teaches disposing the fusing element layer 34 over the structure, covering patterned SiN layer 28 and filling openings 30, 32. (Col. 3, lines 14-20) The Shao et al. reference does not teach the “first barrier metal layer having an upper surface planarized with an upper surface of said cap layer”, “antifuse material...having edges extending over said cap layer” and the “second barrier metal layer...having edges aligned with said edges of said antifuse material layer” as claimed. Because of these significant differences, the Shao et al. reference teaches a structure having a larger fusing element layer 34 that completely covers and extends past the SiN layer 28 on either end thus forming an unnecessarily large capacitor plate. Because the edges of fusing element layer 34 of Shao et al. extend up and over the cap layer, a step is created that renders the Shao et al. antifuse unmanufacturable as a practical matter.

The Shao et al. reference does not teach each and every element, nor the arrangement of these elements, as recited in the claims.

The Yeouchung et al. reference does not teach “...said first barrier metal layer having an upper surface planarized with an upper surface of said cap layer; a layer of antifuse material disposed over said first barrier metal layer and having edges extending over said cap layer; a second barrier metal layer disposed over said antifuse material layer and having edges aligned with said edges of said antifuse material layer” as claimed. The Yeouchung et al. reference teaches a cup-shaped first barrier layer 18, antifuse material layer 22 and second barrier layer 24 are not planar. (Col. 2, lines 42-50; See FIG. 10) The Yeouchung et al. reference does not teach the “first barrier metal layer having an

upper surface planarized with an upper surface of said cap layer”, “antifuse material...having edges extending over said cap layer” and the “second barrier metal layer...having edges aligned with said edges of said antifuse material layer” as claimed. The Yeouchung et al. reference does not teach each and every element, nor the arrangement of these elements, as recited in the claims.

The Shao et al. reference does not teach all elements recited in the claims. The combination of the Shao et al. reference with the Yeouchung et al. reference does not remedy this deficiency. Therefore, the Examiner has failed to make a *prima facie* case of obviousness.

Reconsideration and withdrawal of these rejections is respectfully requested.

Request for Allowance

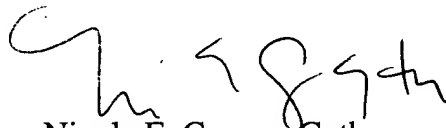
It is believed that this Amendment places the above-identified patent application into condition for allowance.

If, in the opinion of the Examiner, an interview would expedite the prosecution of this application, the Examiner is invited to call the undersigned attorney at the number indicated below.

Dated: October 29, 2003

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Respectfully submitted,
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